

Appl. No. 09/655,113
Amdt. dated 10/20/ 2003
Reply to Office action of 10/07/2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(previously presented) A process for forming a hollow article, comprising:

providing a mixture of metal and ceramic powders, lubricants, and binders, that form a feedstock;

using a disposable material, forming a first molded part that has an outer surface;

through powder injection molding of the feedstock, forming a second molded part that is in contact with said outer surface;

disposing of the first molded part through ash-free combustion; and

heating the second molded part whereby sintering occurs and said hollow article is formed.

2.(original) The process of claim 1 wherein said disposable material is selected from the group consisting of thermoplastic polymers, thermosetting polymers, thermoplastic

Appl. No. 09/655,113
Amdt. dated 10/20/ 2003
Reply to Office action of 10/07/2003

polymers mixed with wax, thermosetting polymers mixed with wax, thermoplastic polymers mixed with gel, thermosetting polymers mixed with gel, thermoplastic polymers mixed with agar, thermosetting polymers mixed with agar, thermoplastic polymers mixed with glycol, and thermosetting polymers mixed with glycol.

3.(previously presented) The process of claim 1 wherein said disposable material is disposed of through vaporization or ash-free combustion.

4.(canceled)

5.{original) The process of claim 1 wherein the step of sintering is performed in a vacuum furnace or in an atmospheric furnace.

6.(previously presented) A process for forming a hollow article, comprising;
providing a mixture of metal and ceramic powders, lubricants, and binders, that form a feedstock;
providing tooling that is able to injection mold from a first barrel into a first mold and from a second barrel into a second mold;
using a disposable material, injected from the first barrel into the first mold, forming a first molded part that has an outer surface;

through powder injection molding of the feedstock from the second barrel into the second mold, forming a second molded part that is in contact with said outer surface;

disposing of the first molded part through ash-free combustion; and

heating the second molded part whereby sintering occurs and said hollow article is formed.

7.(original) The process of claim 6 wherein said disposable material is selected from the group consisting of thermoplastic polymers, thermosetting polymers, thermoplastic polymers mixed with wax, thermosetting polymers mixed with wax, thermoplastic polymers mixed with gel, thermosetting polymers mixed with gel, thermoplastic polymers mixed with agar, thermosetting polymers mixed with agar, thermoplastic polymers mixed with glycol, and thermosetting polymers mixed with glycol.

8.(previously presented) The process of claim 6 wherein said disposable material is disposed of through vaporization or ash-free combustion.

9.(canceled)

10.(original) The process of claim 6 wherein the step of sintering is performed in a

Appl. No. 09/655,113
Amdt. dated 10/20/ 2003
Reply to Office action of 10/07/2003

vacuum furnace or in an atmospheric furnace.

11.(previously presented) A process for forming a hollow article, comprising;

providing a mixture of metal and ceramic powders, lubricants, and binders, that form a feedstock;

providing first and second tooling, one being able to injection mold from a first barrel into a first mold and one being able to injection mold from a second barrel into a second mold;

in the first tooling, using a material, injected from the first barrel into the first mold, forming a first molded part that has an outer surface;

transferring the first molded part to the second tooling;

in the second tooling, through powder injection molding of the feedstock from the second barrel into the second mold, forming a second molded part that is in contact with said outer surface;

disposing of the first molded part through ash-free combustion; and

heating the second molded part whereby sintering occurs and said hollow article is formed.

12.(currently amended) The process of claim 11 wherein said ~~disposable~~ material is selected from the group consisting of thermoplastic polymers, thermosetting polymers,

Appl. No. 09/655,113

Amdt. dated 10/20/ 2003

Reply to Office action of 10/07/2003

thermoplastic polymers mixed with wax, thermosetting polymers mixed with wax,
thermoplastic polymers mixed with gel, thermosetting polymers mixed with gel,
thermoplastic polymers mixed with agar, thermosetting polymers mixed with agar,
thermoplastic polymers mixed with glycol, and thermosetting polymers mixed with
glycol.

13.(previously presented) The process of claim 11 wherein said disposable material is
disposed of through vaporization or ash-free combustion.

14.(canceled)

15.(original) The process of claim 11 wherein the step of sintering is performed in a
vacuum furnace or in an atmospheric furnace.

16.(original) A process for forming a hollow casing with an internal moving part,
comprising;

providing a structure, said structure having a first outer surface;

providing a mixture of metal and ceramic powders, lubricants, and binders, that
form a feedstock;

using a disposable material, forming a first molded part that contacts, and fully

surrounds, said first outer surface, said first molded part having a second outer surface;
through powder injection molding of the feedstock, forming a second molded
part that contacts said second outer surface;
disposing of the first molded part; and
heating the second molded part whereby cermet formation through sintering
occurs, said hollow casing is formed, and the structure is free to move inside said
casing.

17.(original) The process of claim 16 wherein said disposable material is selected from
the group consisting of thermoplastic polymers, thermosetting polymers, thermoplastic
polymers mixed with wax, thermosetting polymers mixed with wax, thermoplastic
polymers mixed with gel, thermosetting polymers mixed with gel, thermoplastic
polymers mixed with agar, thermosetting polymers mixed with agar, thermoplastic
polymers mixed with glycol, and thermosetting polymers mixed with glycol..

18.(original) The process of claim 16 wherein said disposable material is disposed of
through melting or vaporization or ash-free combustion.

19.(original) The process of claim 16 wherein said disposable material is disposed of
through attack by a solvent.

Appl. No. 09/655,113
Amdt. dated 10/20/ 2003
Reply to Office action of 10/07/2003

20.(original) The process of claim 16 wherein the step of cermet formation through sintering is performed in a vacuum furnace or in an atmospheric furnace.

21.(original) The process of claim 16 wherein the structure is magnetic.